Code: 9A01403

R09

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2016

STRUCTURAL ANALYSIS – I

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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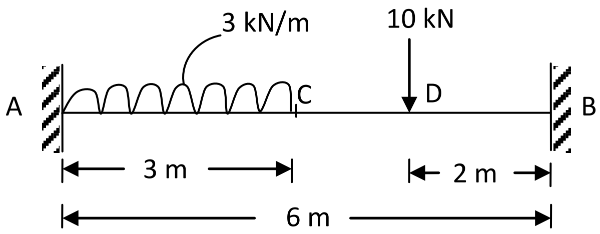
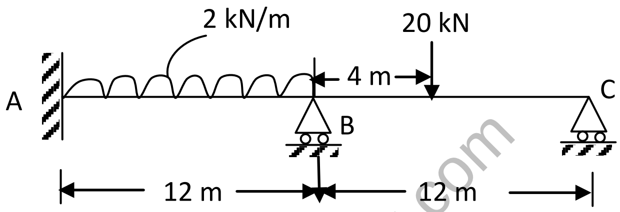
1 A beam AB of uniform section and 6 m span is fixed at the ends. The loading of beam as shown in figure below. Determine fixing moments at ends and draw bending moment and shear force diagram.



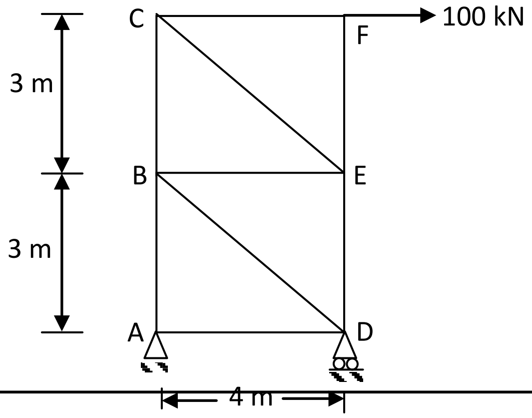
2 A continuous beam is loaded as shown in figure below. The support B sinks by 30 mm. Calculate the support moments and draw bending moment diagram by using theorem of three moments. The values of E and I are 200 GPa and 0.2×10^9 mm^4 respectively.



3 A continuous beam ABCD over three spans AB = 6 m, BC = 4 m and CD = 6 m. The beam AB and BC is subjected to UDL of 1.5 kN/m, where as there is central load of 5 kN in CD. The end A and D is fixed at both ends. Analyze the structure by slope deflection method. Draw bending moment diagram.

4 A beam ABCD is continuous over three spans AB = 8 m, BC = 4 m and CD = 8 m. The beam AB and BC is subjected to UDL of 1.5 kN/m, where as there is a central load of 4 kN in CD. The moment of inertia of AB and CD is 2I and that of BC is I. The ends A and D are fixed. During loading the support A sinks down by 10 mm. Find the fixed end moments and draw bending moment diagram. Use moment distribution method.

5 Determine the horizontal component of deflection of joint F of the frame shown in figure below. The area of cross section of all the members is 1250 mm^2 and E = 2×10^5 N/m^2.



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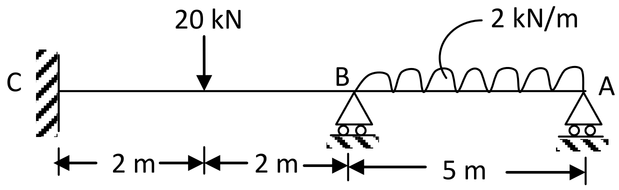
6 (a) Two point loads of 40 kN and 60 kN spaced 6 m apart cross a girder of 16 m span with 40 kN load leading from left to right. Construct the maximum bending moment diagram stating the absolute maximum values.

(b) A uniformly distributed load of 15 kN/m covering a length of 3.5 m cross a girder of span 10 m. Find the maximum shear force and bending moment at a section 4 m from left hand support.

7 (a) The span of simply supported bridge is 30 m and is crossed from left to right by a train of four loads of magnitude 10, 15, 25 and 20 kN leading load and distance them are 1.2 m, 1 m and 0.6 m respectively. Calculate the maximum bending moment and shear force at section 8 m from left end.

(b) A girder simply supported has a span of 25 m. A uniformly distributed load of intensity 20 kN/m and 5 m long cross the girder. Find the maximum shear force 8 m from left support.

8 Analyze the continuous beam shown in figure below by Castigliano's second theorem.



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